

**Claims:**

Amend claims 1-17 as follows:

Claim 1 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, comprising the steps of:

receiving said Boolean function, said Boolean constant and said given subset of the input space;

dividing said given subset of the input space into a set of a plurality of smaller subsets of the input space, whereby the conclusion is positive if said Boolean function is equivalent to said Boolean constant within every member of said set of a plurality of smaller subsets of the input space.

Claim 2 (**currently amended**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 1 further comprising the step of:

determining whether said given subset of the input space is a cube; and

simplifying, if said given subset of the input space is a cube, said Boolean function with substituting the input variables in said Boolean function with Boolean constants according to the substitution requirements provided by definition of said cube, whereby the conclusion is positive if the simplification result is said Boolean



constant, and the conclusion is negative if the simplification result is a Boolean constant other than said Boolean constant.

Claim 3 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 2 further comprising the step of:

replacing said Boolean function with the simplification result of the simplifying step before the dividing step, whereby the simplification result is used as said Boolean function in all later steps.

Claim 4 (**currently amended**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 1 wherein a member of said set of a plurality of smaller subsets of the input space is a cube within said given subset of the input space, whereby it is possible to substitute the input variables in said Boolean function with Boolean constants according to the substitution requirements provided by definition of said cube.

Claim 5 (**currently amended**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 4 further comprising the step of:

simplifying said Boolean function with substituting the input variables in said Boolean function with Boolean constants according to the substitution requirements provided by definition of said cube, whereby the conclusion is positive if the



simplification result is said Boolean constant, and the conclusion is negative if the simplification result is the Boolean constant other than said Boolean constant.

Claim 6 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 5 further comprising the step of:

repeating the dividing step and the simplifying step if the simplification result is not a Boolean constant, whereby said cube is smaller and the simplification result will eventually be a Boolean constant when said cube is small enough.

Claim 7 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 4 wherein said given subset of the input space is represented as a first range of binary integers.

Claim 8 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 7 wherein said set of a plurality of smaller subsets of the input space has only two members: said cube which is represented as a second range of binary integers, and a second member which is represented as a third range of binary integers, whereby said third range of binary integers is divided repeatedly into cubes and such divisions do not need to all complete if the negative conclusion is given for any of these cubes.



Claim 9 (currently amended): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 8 further comprising the step of:

replacing said given subset of the input space, represented as by said first range of binary integers, with said second member of said set of a plurality of smaller subsets of the input space, represented as by said third range of binary integers, after finishing all steps related to said cube and said second range of binary integers which represents said cube, whereby said given subset of the input space become smaller and smaller and whether said Boolean function is equivalent to said Boolean constant within said given subset of the input space can be determined using simplification when said given subset of the input space eventually becomes a cube.

Claim 10 (original): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 9 further comprising the step of:

shifting a boundary of said third range of binary integers before the replacing step if the corresponding boundary of said first range of binary integers is shifted, whereby a boundary of said first range of binary integers can shift dynamically.



Claim 11 (currently amended): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 4 further comprising the step of:

substituting the input variables in said Boolean function with Boolean constants according to the substitution requirements provided by definition of said cube, whereby any tautology checking method can be used to process the Boolean function resulted from the substitution.

Claim 12 (original): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 11 wherein said given subset of the input space is represented as a first range of binary integers.

Claim 13 (original): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 12 wherein said set of a plurality of smaller subsets of the input space has only two members: said cube which is represented as a second range of binary integers, and a second member which is represented as a third range of binary integers, whereby said third range of binary integers is divided repeatedly into cubes and such divisions do not need to all complete if the negative conclusion is given for any of these cubes.



Claim 14 (currently amended): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 13 further comprising the step of:

replacing said given subset of the input space, represented as by said first range of binary integers, with said second member of said set of a plurality of smaller subsets of the input space, represented as by said third range of binary integers, after finishing all steps related to said cube and said second range of binary integers which represents said cube, whereby said given subset of the input space become smaller and smaller and whether said Boolean function is equivalent to said Boolean constant within said given subset of the input space can be determined using simplification when said given subset of the input space eventually becomes a cube.

Claim 15 (original): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 14 further comprising the step of:

shifting a boundary of said third range of binary integers before the replacing step if the corresponding boundary of said first range of binary integers is shifted, whereby a boundary of said first range of binary integers can shift dynamically.



Claim 16 (**currently amended**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 1 further comprising the step of:

determining whether said given subset of the input space is a cube; and substituting, if said given subset of the input space is a cube, the input variables in said Boolean function with Boolean constants according to the substitution requirements provided by definition of said cube, whereby any tautology checking method can be used to process the Boolean function resulted from the substitution.

Claim 17 (**original**): A method for determining whether a Boolean function is equivalent to a Boolean constant within a given subset of the input space, as in claim 1 further comprising the step of:

starting a process for each member of said set of a plurality of smaller subsets of the input space determining whether said Boolean function is equivalent to said Boolean constant within said member of said set of a plurality of smaller subsets of the input space, whereby these processes can run on the same computer or on several computers, at the same time or at different times.